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Develop Multiple Applications using Ultra-High Throughput Droplet-based Microfluidic Platform

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Abstract

The growing interdisciplinary field of droplet microfluidics has many applications within biological sciences. Much like how computers have advanced to fit into your pocket many laboratory experiments can be downscaled significantly because of this relatively new technology. Droplet based micro fluidics is done on a "lab on a chip device"- just like the name implies-it combines many laboratory functions onto a small device composed of channels; these devices will require less reagent, less sample size and, less lab equipment to be able to run a faster bioassay. These microfluidic devices exploit fluid physics and a pump system to form droplets with encapsulated cells and/or chemical reagents for biology and chemistry study. This ultra-high throughput droplet generator can generate ~5000 droplets/sec with picoliter size. With the amount of droplets formed, large scale bioassays are possible. Currently we developed many applications using this platform, such as single-cell/bacteria encapsulation, protein crystallization and nanomaterial crystallization.